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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,009	09/24/2003	Yoshinobu Takeyama	242228US2	1795
22850	7590	03/14/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ELLIS, SUEZU Y	
			ART UNIT	PAPER NUMBER
			2878	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/669,009

Applicant(s)

TAKEYAMA ET AL.

Examiner

Suezu Ellis

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9, 11-13, 18-25, 27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4, 12, 22-25, 27 and 28 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9, 11, 13, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 1-3, 5-9, 12, 13, 18-25, 27 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **RESPONSE TO AMENDMENT**

### ***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the temperature detector and determining unit (claim 8) must be shown or the features canceled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claims 1, 3-5, 8, 9, 12, 13, 18-25, 27 and 28 are objected to because of the following informalities:

In claim 1, line 11, claim 3, lines 11 and 20, claim 4, line 11, claim 22, line 11, claim 23, line 11, claim 24, line 11, replace "counts number" with --counts a number--.

In claim 1, line 11, claim 3, lines 11 and 20, claim 4, line 11, claim language recites "adjusting unit that, counts". Remove the comma.

In claims 1, lines 14-15, claim 3, lines 14-15, claim 4, lines 14-15, claim 13, line 8, claim 18, line 8, claim 19, line 8, claim 21, line 8, claim language recites "and adjusts using the clock generating units a write clock". This wording seems a bit awkward. Please add commas and/or reword. Suggested wording "and using the clock generating units, adjusts a write clock" or "and uses the clock generating units to adjust a write clock frequency" or "adjust, using the clock generating units, a write clock frequency".

In claim 1, line 12, claim 3, line 12, claim 4, line 12, claim 9, lines 2 and 4, claim 12, line 9, claim 22, line 11, claim 23, line 11 and claim 24, line 11, claim language recites "a period since". Please reword. Suggest wording: "a period from when" or "a period when".

With respect to claim 3 and claim 23, claim language is interpreted such that the number of clocks, the write clock frequency and the reference value in claim 3, lines 20-26 and claim 23, lines 19-25 are different from those recited in claim 3, lines 11-16 and claim 23, lines 10-15. It is also interpreted that the periods from which the number of

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clocks of a write clock are counted, as recited in claim 3, lines 20-26 and claim 23, lines 19-25, is from that recited in claim 3, lines 11-16 and claim 23, lines 10-15. However, for ease of clarity and understanding, please reword the claim to better differentiate the number of clocks, the write clock, the period, the reference value, and the write clock frequency in claim 3, lines 11-16 and claim 23, lines 10-15 from those in claim 3, lines 20-26 and claim 23, lines 19-25. Perhaps both paragraphs in claim 3 and claim 23 are not needed if written more concisely.

In claim 4, line 15, the word "units" is misspelled.

In claim 5, line 4, claim language recites "the write clock frequency of the laser beams becomes minimum mutually". The "becomes minimum mutually" is awkwardly written. Please reword.

In claim 8, lines 4 and 8, claim language recites "is higher than a predetermined value". This wording is awkward. Please reword. Suggested wording: "is greater than a predetermined value".

In claim 9, line 4, claim language recites "is calculated an average of periods". This phrase is awkward. Please reword.

In claim 12, line 9, replace "counting number" with --counting a number--.

In claim 12, line 12, claim language recites "selecting a count of the number of clocks for one laser beam, out of the counts of the number of clocks for the laser beams, as a reference value." This wording is awkward. Please reword. Suggested wording: "selecting from the counts of the number of clocks for the laser beams, a count of the number of clocks for one laser beam as a reference value".

In line 7 of claims 13, claim 18, claim 19, claim 25, claim 27, and claim 28, replace "to counts a number" with --to count a number-- for correct verb tense.

Appropriate correction is required.

### ***Specification***

The disclosure is objected to because of the following informalities:

The specification recites "period since a desired one of the first detecting units..." throughout the specification. This wording is awkward. Please reword. Suggested wording "period from when a desired a desired one of the first detecting units...".

Appropriate correction is required.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

With respect to claim 8, the specification does not appear to describe the inclusion of an temperature detector and a determining unit that detects whether a change in predetermined time of the ambient temperature detected by the temperature detector is greater than a predetermined value. Please incorporate the inclusion of a temperature detector and a determining unit in the specification.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5-8, 11 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over Japanese patent JP 2001-180043 (Maeda). See pre-grant publication 2001/0028387 for translation purposes.

With respect to claim 1, 2 and 13 are Maeda illustrates in Figs. 11 and 27, an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to expressly disclose in Fig. 27, a plurality of second detecting units disposed at a second position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. In reference to Fig. 2, Maeda discloses when the laser scans both of the sensors (201 and 202), the sensors may output synchronization detection signals DETP 1 and DETP 2, respectively. Maeda

further illustrates in Fig. 27, each image forming apparatus having a magnification correction section (208-1, 208-2) wherein each magnification correction section generates its own write clock. Note, Fig. 22 is a block diagram of the construction of the magnification correction section (208) that illustrates the inclusion of a write clock generating section (302). Maeda discloses the magnification correction section adjusts the clock frequency ([0085]). Maeda further discloses a time difference counting section measures the time difference between the generation time periods of DETP 1 and DETP 2, where section includes a counter that will be reset by the DETP 1 and start counting write clocks that are generated via a write clock generator ([0085], [0089]). Maeda further discloses the inclusion of a reference clock generator (208) to create reference counts. Fig. 9 illustrates the adjustment of the write clock frequency so as to coincide with the reference value. Maeda further discloses it is well known in prior art that the write clock frequency generally controls lighting control of a laser diode and increases image density when the number of frequency is increased ([0008]). The image density is deemed to be a condition of image forming process that occurs after the clock frequency is adjusted. It would have been obvious to a person of ordinary skill in the art to change the image density in order to produce a higher quality image.

With respect to claim 5, the modified Maeda discloses that when selecting a reference value (prescribed amount), the clock frequency adjusting unit selects a time difference substantially equal to a reference time difference thus the adjustment can be substantially precise, thus the amount of adjustment is a minimum ([0091]).



With respect to claim 6, the modified Maeda fails to expressly disclose the second detecting unit being a linear charge-coupled device (CCD), however it is well known in the art to use a linear CCD as a sensor. It would have been an obvious design choice to modify the second detecting unit to be a linear CCD since CCDs are readily available.

With respect to claim 7, the modified Maeda discloses the adjustment of the write clock frequency (magnification correction) occurs when image formation begins ([0185]).

With respect to claim 8, the modified Maeda discloses a temperature detector that detects and ambient temperature (initial temperature of the f $\theta$  lens) and a determining unit that detects a change in predetermined time ([0026], line 7; [0029]; [0135]). The modified Maeda further discloses the clock frequency adjusting unit (magnification correction section) adjusts the write clock frequency based upon the temperature. Since the adjustment is made in accordance with the temperature, there must be a determining unit/comparison means to determine the difference in the temperatures.

With respect to claim 11, the modified Maeda further discloses in Fig. 11 an intermediate transfer body (B), a plurality of image forming units opposite to the moving surface of the intermediate transfer body, where each image forming unit includes an image carrier (109), a writing unit (Fig. 16), and a plurality of developing units (108).

Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Neary (US 6,151,152).

With respect to claim 9, the modified Maeda addresses all the limitations of claim 1. The modified Maeda fails to disclose the period (time difference) measured from the first detecting unit to the second detecting unit until the units detect the laser, is averaged. Maeda and Neary are directed to a similar field of endeavor of scanning systems. Neary discloses it is well known to calculate an average time value for the time difference (col. 3, lines 46-58). It would have been obvious to a person of ordinary skill in the art to calculate an average time value in order to correct the reference frequency error to adjust the reference frequency.

Claims 3 and 18 are rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Ozaki et al. (US 6,243,124). Hereinafter, Ozaki et al. will be referred to as Ozaki.

With respect to claims 3 and 18, Maeda illustrates in Figs. 11 and 27, an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to expressly disclose in Fig. 27, a plurality of second and third

detecting units disposed at a second and third position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. In reference to Fig. 2, Maeda discloses when the laser scans both of the sensors (201 and 202), the sensors may output synchronization detection signals DETP 1 and DETP 2, respectively. Maeda further illustrates in Fig. 27, each image forming apparatus having a magnification correction section (208-1, 208-2) wherein each magnification correction section generates its own write clock. Note, Fig. 22 is a block diagram of the construction of the magnification correction section (208) that illustrates the inclusion of a write clock generating section (302). Maeda discloses the magnification correction section adjusts the clock frequency ([0085]). Maeda further discloses a time difference counting section measures the time difference between the generation time periods of DETP 1 and DETP 2, where section includes a counter that will be reset by the DETP 1 and start counting write clocks that are generated via a write clock generator ([0085], [0089]). Maeda further discloses the inclusion of a reference clock generator (208) to create reference counts. Fig. 9 illustrates the adjustment of the write clock frequency so as to coincide with the reference value. Maeda and Ozaki are directed towards a similar field of endeavor of image forming apparatuses. Ozaki discloses in Fig. 5, an optical system which comprises three CCD sensors in three different positions along the

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main scanning direction. It would have been an obvious design choice to a person of ordinary skill in the art to modify Maeda to include a plurality of third detection units in a third position in order to more accurately detect the position of the laser during scanning. Ozaki discloses a clock pulse generator for generating a clock pulse for clocking and a count circuit to counting the clock pulses, wherein the scanning period is determined by the number of clock pulses outputted from the generator (col. 26, lines 1-3, 46-48). Ozaki fails to expressly disclose the third detecting unit counting the number of clocks as a reference value and adjusting the write clock frequency to coincide with the reference value. However, it would have been an obvious design choice to a person of ordinary skill in the art to incorporate the counting the number of clocks as a reference value and adjusting the write clock frequency to coincide with the reference value as another way to determine the position of the laser beam.

Claim 19 is rejected under 35 U.S.C. 103(a) as being obvious over Maeda in view of Fujii et al. (US 5,424,765). Hereinafter, Fujii et al. will be referred to as Fujii.

With respect to claim 19, Maeda discloses an image forming apparatus comprising a plurality of optical systems (image formation units) and optical carriers (laser beam scanning units), wherein each system scans a surface of the image carrier with a laser beam to form a multi-color image by superimposing each of four colors, wherein each image formation section has one color (e.g. yellow, magenta, cyan and black) ([0105]). Maeda further discloses a plurality of first detectors that are disposed at a first position along the main scanning direction of the laser. Although Maeda fails to

expressly disclose in Fig. 27, a plurality of second detecting units disposed at a second position along the main scanning direction of the laser, Maeda does disclose in Fig. 2, it is well known for a single system to have both first and second detecting units disposed at a first and a second position along the main scanning direction of the laser. Thus, it would be an obvious design choice that both optical systems in Fig. 27 would have a first and second detecting unit as well, in order to detect the start and end of the scanning direction. Maeda further illustrates in Fig. 27, each image forming apparatus having a magnification correction section (208-1, 208-2) wherein each magnification correction section generates its own write clock. Note, Fig. 22 is a block diagram of the construction of the magnification correction section (208) that illustrates the inclusion of a write clock generating section (302). Maeda discloses the magnification correction section adjusts the clock frequency ([0085]). Maeda further teaches it is well known in the art for adjusting the number of clocks of a write clock frequency dependent on signals from the detecting units ([007], [0008]). Maeda fails to expressly disclose the clock frequency adjusting unit including a phase-locked loop with variable filters. Fujii discloses using a phase-locked loop, which includes a phase comparator and a low-pass filter, for generating a reference signal in a scanning device (col. 3, lines 34-36). Fujii fails to expressly disclose the phase-locked loop having variable filters, however, it would have been an obvious design choice to a person of ordinary skill in the art to include a phase-locked loop with variable filters to the clock frequency adjusting unit of Maeda in order to fine-tune the adjustment of the clock frequency.

***Allowable Subject Matter***

Claims 4, 12, 22-25, 27 and 28 are allowed.

With respect to claims 4 and 24, prior art fails to teach or reasonably suggest, the clock frequency adjusting unit comprising a phase-locked loop with variable filters that multiplies a reference clock by a multiple N and varies the number of filters in the phase-locked loop and the multiple N to adjust the write clock frequency.

With respect to claims 12, 22, 23, 25, 27 and 28, prior art fails to teach or reasonably suggest a clock frequency adjusting unit shared by the optical systems, in addition to the other limitations of the claims.

Claims 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 20, prior art fails to teach or reasonably suggest the phase-locked loop multiplies a reference clock by a multiple N.

With respect to claim 21, prior art fails to teach the clock frequency adjusting unit varies the number of filters in the phase-locked loop and the multiple N to adjust the write clock frequency.

***Response to Arguments***

Applicant's arguments regarding claims 1-9, 11,13, 18 and 19 have been fully considered but they are not persuasive.

Applicant's amendment to claims 1, 3, 13, 18 and 19, to include clock generating units for each laser beam, fails to overcome prior art rejection over Maeda. Maeda discloses in Fig. 27, each image forming apparatus having a magnification adjusting section (208-1, 208-2) wherein each magnification adjusting section generates its own write clock. Note, Fig. 22 is a block diagram of the construction of the magnification adjusting section (208) that illustrates the inclusion of a write clock generating section (302).

Applicant's amendment to claims 12, 22, 23, 25, 27 and 28 have been fully considered and are persuasive. The rejection of claims 12, 22, 23, 25, 27 and 28 has been withdrawn.

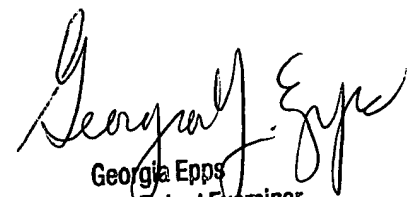
#### ***Telephone/Fax Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suez Ellis whose telephone number is (571) 272-2868. The examiner can normally be reached on 8:30am-5pm (Monday-Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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Georgia Epps  
Supervisory Patent Examiner  
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